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STUDIES ON ARIZONA ANTS.
2. NEW DATA ON THE ECOLOGY OF *APHAENOGASTER HUACHUCANA* AND A DESCRIPTION OF THE SEXUAL FORMS

By Wm. S. Creighton
Department of Biology, College of the City of New York

In 1932 the writer presented, in this journal, a description of the worker of *Aphaenogaster* (*Attomyrma*) *huachucana* (1). The type specimens came from a single nest taken at an elevation of about 7000 feet in Ramsey Canyon in the Huachuca Mountains. I expected that other workers would find additional material of *huachucana* and that this would permit a better evaluation of its status, for *huachucana* is clearly related to *texana*. Since the latter species is also present in the Huachucas, much might be learned from the way in which the two insects behave in that area. In 1950 I synonymized Wheeler's variety *furvescens* with *texana* (2). The variety *furvescens,* which was based on material coming from the Huachucas, had proven to be a color phase that occurs over the entire range of *texana.* The synonymy of this variety raised disturbing possibilities in the case of *huachucana,* for there was a chance that it might also prove to be an inconsequential variation of *texana* when better known. In order to test the significance of the structural features on which *huachucana* was based, more material was urgently needed. This material has now come to hand and with it field data which provide good evidence that *huachucana* is a separate species. In order for this evidence to be appreciated it is necessary

to discuss the range and ecological response of *texana* as well as those of *huachucana*.

It is impossible to give a concise account of the behavior of *texana* in the field. The species has a wide but discontinuous distribution in the southern United States. As far as can be determined all of the range of *texana* lies south of the 38th parallel and the great majority of it lies south of the 36th parallel. At this latitude, and south of it, the range extends from the Atlantic seaboard states to Arizona. This seems simple enough, but a careful examination of the stations in which *texana* has been taken will show that they have remarkably little in common. Thus, *texana* is abundant at sea-level in the neighborhood of Miami, Florida (Wheeler, Smith). It has been reported from damp woods at an elevation 1800 feet in the Great Smoky Mountains of Tennessee (Cole). It occurs in the foot-hills of the Appalachians in South Carolina (Smith) and northern Alabama (Creighton). It has been taken at an elevation of 900 feet on the plains of southern Kansas (Wheeler). It inhabits shady ravines in central Texas (Wheeler). It has been found on Bright Angel Trail below Indian Garden in the Grand Canyon (Wheeler). It is abundant at the 6000 foot level on sunny slopes in the canyons of mountains of southern Arizona (Wheeler, Creighton).[1] All these stations lie south of the 38th parallel, but I fail to see that there is any other feature which they share that could be cited as a reason why they were selected as nest sites by *texana*. Under such circumstances it appears hopeless to attempt a generalization which will cover the behavior of *texana* over its entire range. However the situation is by no means difficult if field observations are limited to a particular part of the range. For it seems that wherever this insect has been found in sufficient numbers to permit an adequate view of its behavior, this behavior has been surprisingly constant for the area involved. Thus, in the Huachuca Mountains the range of *texana* lies in the lower part of the evergreen oak belt which, on the northeastern

[1] *A. texana* also occurs in the northern part of the Sierra Madre Oriental. The writer has recently taken it on Chipingue Mesa (2400′-4200′) and near Iturbide (2800′) Nuevo Leon, Mexico.

slopes of the mountains, extends from the canyon mouths to an elevation of about 7000 feet.

This evergreen oak area is an interesting one. Shreve calls it a "western xeric evergreen forest in which oaks are dominant" (3). The term "forest" is apt to mislead those who expect a forest to consist of sizeable trees. It is only under especially favorable conditions that this association produces a forest in the popular sense. In certain areas, however, the evergreen oaks form groves in which the trees may be thirty or forty feet high. On the northeastern slopes of the mountains the best stands of evergreen oaks occur at elevations of about 6500 feet. At higher elevations the groves become increasingly mixed with pines until, at an elevation of about 7000 feet, the pines replace the oaks. As one descends from the 6500 foot level most of the evergreen oaks decrease in size and at the 6000 foot level, and below it, they are usually stunted, bushy little trees not more than ten or twelve feet high and often much smaller. These little oaks frequently form dense thickets, but the thickets are seldom extensive and generally the evergreen oaks at the 6000 foot level are thinly scattered over the slopes which rise from the stream bottom. Along the stream bottom at this level groves are almost always present, but these consist of various deciduous trees and large junipers.

In the area just described I have observed several dozen nests of *texana*. The majority of the nests of this ant are situated between the 5500 and 6000 foot levels. The area selected is almost always a sunny, open slope, far enough away from the stream bottom to be out of the shade of the groves which occur there. As a rule the nests are placed so that they avoid even the scant shade furnished by the small evergreen oaks. Since the nests are often less than fifty yards away from areas of heavy shade, it seems clear that the nest-founding female prefers sunny places to shady ones. Above the 6000 foot level the incidence of the colonies decreases as the elevation increases. For practical purposes the upper limit of the range is reached about the 6500 foot level. I have found one nest of *texana* at an elevation of 6700 feet but the incidence of nests above

the 6500 foot level is very small and I feel sure that colonies founded above this level only rarely come to maturity. This rather abrupt termination of the range in the neighborhood of 6500 feet offers a marked contrast to the abundance of *texana* at lower levels. It should be noted that at these lower levels, and on the same slopes where the nests of *texana* occur, there is an extraordinarily rich ant fauna. Conspicuous in it are representatives of genera which are typically Sonoran (*Pogonomyrmex, Myrmecocystus, Xiphomyrmex,* etc.). It is true that these Sonoran elements are not as abundant in the evergreen oak belt as they are on the plains at the base of the mountains (where *texana* appears to be absent) but they are sufficiently well represented to give the lower part of the evergreen oak association a distinctly Sonoran character. It may, therefore be stated that, in the Huachuca Mountains, *texana* is associated with the Sonoran elements of the biota and shows little tendency to nest outside the area where the Sonoran representatives occur.

The association where *huachucana* is found is a wholly different one. This is Shreve's "northern mesic evergreen forest". This association occurs in various parts of Arizona and because its constituent plants vary somewhat with latitude, it is more difficult to characterize than is the evergreen oak association. In the Huachuca Mountains the northern mesic evergreen forest is predominantly a zone of pines. As noted above the lower edge of this pine belt mingles with the upper edge of the evergreen oak belt. At the 7000 foot level on the northeastern slopes the pines are the dominant element of the flora. At the 8000 foot level the stand of pine is frequently interrupted by aspen groves. These groves continue to the tops of the peaks but do not form a belt. According to Shreve the pines may be replaced by spruce and fir at elevations above 9000 feet. If this is true in the Huachucas the spruces and firs must be limited to a small area at the top of Miller Peak and Carr Peak. The five nests of *huachucana* which were found during the summer of 1950 were all situated between the 7000 and 8000 foot levels. The area in which they occurred lay between the head of Carr Canyon and the

lower slopes of Carr Peak. In this same area were taken representatives of typically northern ant groups (*Polyergus, Myrmica, Raptiformica, Camponotus* sen. str., *Stenamma*, etc.). Since the Sonoran elements of the evergreen oak belt are absent at these elevations, the ant fauna above the 7000 foot level has an entirely different character from that of the 6000 foot level. Its affinities are Transitional or Canadian and the presence of *huachucana* in this association offers a good demonstration that this insect belongs with the northern elements of the biota. It may be added that all the nests of *huachucana*, including the type nest, were situated on steep slopes. They were placed in shady aspen groves, in the lighter shade of pine groves or in full sun. Some were built in the soil under a covering stone, others in the soil which had accumulated between the stones in a rock slide. In view of the fact that *texana* is quite fussy about its nest sites, the greater tolerance of *huachucana* in this respect is surprising.

What is even more surprising is that the range of these two species should be so clearly separated by so small an amount of space. It should be plain from the discussion just presented that there is an elevational gap of some five hundred feet between the lower edge of the range of *huachucana* and the upper edge of the range of *texana*. The distance involved is such a minor one that it could not conceivably be a direct barrier to movement in either direction, particularly to winged females. We must suppose, therefore, that the gap between the ranges exists not because either species is unable to enter it but because, when they have done so, each species finds the area unsuitable as a situation for a successful nest. Both *huachucana* and *texana* (at least that part of its population which occurs in the Huachucas) have developed a degree of environmental restriction which isolates the two species as effectively as though their ranges were separated by hundreds of miles. In view of the actual proximity of the ranges one may inquire how this isolation can be maintained. There is every reason to believe that at the time of nuptial flight, many males and females of each species reach the range of the other species. If the nuptial flight

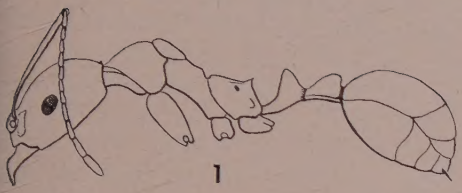
of *texana* coincides with that of *huachucana*, there would be ample opportunity for cross-fertilization and, if this occurred, the two populations would soon merge. The fact that the two populations show no sign of intergradation may be taken as proof that no cross-fertilization is occurring. If it can be shown that the nuptial flights of the two species take place at different times, one need look no further for the mechanism which maintains the two populations as separate entities. The evidence on this point is scanty but it seems significant nonetheless. One nest of *huachucana*, secured on July 24th, contained a few mature males and many mature females. There were no male or female pupae in this nest and only a few callows of the sexual forms. This leads me to believe that the nuptial flight was about to take place. If so, the marriage flight of *huachucana* must occur at the end of July or the first of August. During the month of July (7th-28th) a number of nests of *texana* were examined. No winged sexual forms were found in any of them. Either the nuptial flight had taken place before July 7th or it would be some weeks before the sexual forms matured, in which case the flight would come much later in the summer. In either case the nuptial flight of *texana* would not coincide with that of *huachucana*.

The descriptions of the male and female of *huachucana* which follow deal mainly with details of sculpture, pilosity and color. The general structural features of all three castes of this insect are shown in the figures on Plate 7.

Female: length; head (exclusive of mandibles) 1.6 mm.; thorax 3 mm.; total length 8-9 mm. Mandibles with fine and rather even longitudinal striae which spread slightly as they approach the masticatory margin. Clypeus and frontal area with slightly wavy, longitudinal rugae. Longitudinal rugae on the cheeks and front notably coarser and much more wavy. Longitudinal rugae immediately behind the

EXPLANATION OF PLATE 7

Aphaenogaster (*Attomyrma*) *huachucana* Creighton. Fig. 1. Worker. Fig. 2. Male, wings on left side removed. Fig. 3. Female, wings on left side removed. (Figs. 1-3 to the same scale.) Fig. 4. Head of worker (drawn from type). Fig. 5. Head of male. Fig. 6. Head of female.



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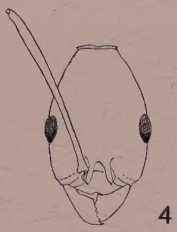

4

2

5

3

6

CREIGHTON — ARIZONA ANTS

frontal lobes without transverse connectives, not reticulate. Those rugae which are immediately lateral to this central band distinctly reticulate, as are most of those on the cheeks and genae. Rugae on the occiput confined to the area adjacent to the lateral ocelli. These occipital rugae are strongly reticulate, not longitudinal. Behind them is a band which extends to the occipital flange that is not reticulate but covered with piligerous punctures only.

Pronotum with wavy rugae whose direction is roughly parallel to the suture between the pronotum and the scutum. Scutum with very feeble rugae in front which become stronger toward the rear, particularly at the middle third of the scutum. These rugae continue across the paraptera and the anterior half of the scutellum but turn inward and become transverse on the posterior half of the scutellum. Epinotum transversely rugose, the rugae on the concave area above and between the epinotal spines more feeble than elsewhere. Mesothoracic sternite and episternite with feeble rugae, their surface more shining than the other thoracic sclerites. Petiole granulo-rugose, dull; postpetiole with few rugae and with feebler granulation than the petiole, particularly at the crest where it is rather strongly shining. Coxae and gaster strongly shining, the principal sculpture consisting of scattered piligerous punctures. The surface of the gaster also has an extremely delicate reticulate sculpture which is so fine that it can be seen only at high magnifications and in oblique lights. Appendages more heavily punctured and with their surface less shining than the coxae and gaster.

Erect hairs on the head, thorax and gaster golden in color and rather short. Fairly numerous on both the upper and lower surfaces of the head. About equally numerous on the scutum and the scutellum. Sparse on the pronotum and usually absent entirely on the mesothoracic sternite and episternite. Erect hairs on the petiole largely confined to the rear face of the node. Postpetiole with the erect hairs more evenly distributed, most of those on the dorsal surface distinctly longer than those on the ventral surface. Erect hairs evenly spaced over the entire dorsum of the first gastric segment. On succeeding segments the erect hairs are

largely or entirely confined to the rear edge of the segment. Erect hairs on the fore coxae longer than those anywhere else on the body. Femora with short, fine, erect hairs on their flexor surfaces, the hairs appressed on the lateral and extensor surfaces. Tibiae with the hairs appressed. Tarsi with very abundant, fine hairs which are appressed except on the flexor surface, where they are semi-erect. Antennal scapes with very fine appressed hairs. Funiculi with semi-erect hairs which become finer on the last four segments and form pubescence on the terminal segment. The entire insect without pubescence elsewhere.

Head, thorax, gaster and antennae an even, rich, reddish yellow. The legs clear yellow. Wings hyaline with iridescent reflections. The veins clear yellow, the stigma brown. Posterior edge of the wing evenly fringed with short, fine hairs.

Male: length; head (exclusive of the mandibles) 1 mm.; thorax 2.25 mm.; total length 5.5-6 mm.

Mandibles smooth, moderately shining, with numerous fine punctures. Clypeus and frontal lobes a little less shining than the mandibles, the punctures less distinct and tending to form longitudinal rows. Front and occiput feebly shining with a fine but dense reticulate sculpture over most of the surface except between the two lateral ocelli, where prominent transverse rugae are present. Entire thorax smooth and shining, largely without sculpture. Posterior half of the scutellum and the entire metanotum with a delicate, reticulate sculpture which dulls the surface to some extent. Posterior half of the epinotum rugose and coriaceous both on the basal face and on the sides. The suture separating the mesothoracic sternite from the episternite and that lying between the epinotum and the metathoracic epimeron crossed by coarse, widely separated rugae. A few of these rugae run out onto the surface of the adjacent segments. Petiole feebly shining, the upper surface evenly covered with fine punctures, the posterior face of the node and the ventral surface with three or four feeble longitudinal rugae. Postpetiole and gaster more strongly shining than the petiole, the surface covered with extremely delicate

and shallow punctures which are visible only at high magnifications.

Erect hairs yellow or whitish yellow, present on the clypeus, the gula, the space between the occipital angles and the posterior border of the eye and the ocellar triangle. Hairs on the mandibles much finer than those on the rest of the head. Erect hairs very sparse or absent over most of the thorax. Those on the scutum very short. A cluster of somewhat longer hairs is present on the scutellum. Petiole without erect hairs. Postpetiole with about six long hairs on its posterior dorsal surface and a few shorter ones on the ventral surface. Erect hairs evenly spaced over the entire gaster. Hairs on the legs for the most part very fine and completely appressed. A few erect hairs on the fore coxae and fore femora. Antennal scapes and the first eight funicular segments evenly covered with fine, semi-erect hairs which grade into pubescence on the last four segments.

Mandibles clear yellow; clypeus, antennae and legs yellow, infuscated very lightly and somewhat unevenly with brown. Head, except for the appendages, blackish brown. Thorax brownish yellow except for the scutum which is clear brown. Petiole, postpetiole and gaster brownish yellow. Wings as in the female.

The additional material of *huachucana* has brought up some points which should be mentioned here. The peculiar narrowed rear of the head which is very apparent in the worker types (Plate 7, fig. 4) is not a uniform character. A number of workers of *huachucana* show a greater degree of convexity in the part of the head which lies between the occipital flange and the rear of the eye. Such workers approach *texana* closely in head shape. There is also considerable variation in the shape of the epinotal spines, although these spines in *huachucana* are never as thin and delicate as they are in *texana*. On the other hand, all the workers of *huachucana* which the writer has seen differ from those of *texana* in their larger size, their heavier and more rugose sculpture, in the more abruptly elevated rear edge of the mesonotum and in the prominent, triangular lobe at the base of the scape. These features seem to be thoroughly

reliable as separatory characters for the worker. Three of them will apply to the female as well. The female of *huachucana* is larger than that of *texana* (8-9 mm. in *huachucana*). It is also more heavily sculptured and possesses the same triangular lobe at the base of the antennal scape which marks the worker. In this connection it should be noted that the length given for the female of *texana* in Wheeler's 1915 publication (4) evidently included the wings. Wheeler gave the length of the female of *texana* as 11-11.5 mm. On the same page he gave the length of the dealated female of *furvescens* as 7.5 mm. Needless to say the second figure is the correct one for *texana* if, as is usually the case, the body length is what is being measured. The male of *huachucana* is larger than that of *texana* (4-5 mm. in *texana*, 5.5-6 mm. in *huachucana*). The scutum in the male of *huachucana* does not project so strongly above the pronotum. The basal face of the epinotum in the male of *huachucana* consists of descending anterior portion and a feebly convex posterior portion which form a distinct angle in profile (Plate 7, fig. 2). This face of the epinotum forms a single descending plane in *texana*.

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A NEW SPECIES IN THE CHILOPOD GENUS *THEATOPS*

By Ralph V. Chamberlin
University of Utah

The finding of a new species of *Theatops*, making the fourth well defined species known in the genus, is of considerable interest. The type of the new form was taken in a cave in Sonora, Texas, and may be a definitely cavernicolous species. The four species of the genus may be distinguished by means of the following key.

Key to Species of *Theatops*

1 (3) Prefemur of anal legs with no spine at mesodorsal corner 2

2 Prefemur and femur of anal legs entirely lacking spines or teeth; coxopleurae not mesally elevated, with no spine; tibiae 1 to 9 with a single ventral spine. . . . . *postica* (Say)

Prefemur and femur of anal legs each with one ventral spine; coxopleurae with inner border elevated and bearing caudally a spine or tooth; at least some of the tibiae 1 to 9 bearing a second spine. . . . . *erythrocephala* (Koch)

3 (1) Prefemur of anal legs with a distinct distal spine at mesodorsal corner 4

4 Last tergite with no median longitudinal sulcus; antennae and articles of normal length. . . . . *spinicauda* (H. C. Wood)

Last tergite with a sharply impressed median longitudinal sulcus; antennae and its articles long and slender . . . . . *phanus*, n. sp.

Theatops phanus, n. sp.

Color pale yellow. Head smooth, without sulci; overlapping the first tergite. Antennae exceptionally long, reaching back to the sixth segment. First tergite with the transverse sulcus forming an obtuse angle at the middle, this sulcus crossed by a longitudinal median sulcus which furcates posteriorly. Dental plates of prosternum elongate, narrowing distad; the distal margin oblique, smooth or with an obscure nodule at outer and inner ends. Second to twentieth tergites bisulcate. The last tergite elongate as usual; with a sharply impressed median longitudinal sulcus. Sternites smooth, with no definite longitudinal sulcus but on most a median depression or shallow pit. Last sternite long and slender, narrowing caudad, the posterior corners rounded. Coxopleurae caudally truncate, with a small spinous point at inner corner which is slightly produced dorsocaudad; poriferous area ending caudally nearly on a level with the end of the sternite. Prefemur of anal legs with a well developed spine at the dorsocaudal corner as in *spinicauda,* otherwise without true spines or teeth, but with the mesodorsal and mesoventral margins compressed into a sharp edge bearing a few well separated denticles, not closely finely serrate as in *spinicauda.* Femur with two compressed ridges as in the prefemur. Terminal claw obviously more slender than in *spinicauda.*

Length: 42 mm. Length of antennae, 14 mm.

Locality: Texas: Sonora, in a cave on Stevenson's Ranch. One specimen found beneath stone on bottom of first drop in the vertical cave. Collected by G. G. Stevenson on April 16, 1926.

ON TWO NORTH AMERICAN PHILOTARSIDS (PSOCOPTERA)[1]

By Edward L. Mockford
Indianapolis, Indiana

Until now, but a single species of Philotarsidae has been known from North America.[2] While collecting at Port Townsend, Washington, I found a second species, in the genus *Philotarsus,* apparently new. Unfortunately, good specific characters of only one species, the European genotype, are available to me for comparison, but the figures given here should be adequate for separation of the new species. Described early from eastern United States was *Philotarsus maculosus* (Aaron). This species cannot fit in *Philotarsus* as restricted by Badonnel (1943), but remains in this family. I therefore propose a new genus for it named in honor of its describer.

Genus **Aaroniella** n. gen.

Differs from *Philotarsus* in that (1) Rs in hind wing is ciliated, though sparsely, for its entire length beyond its separation from M, (2) sense tubercles of male paraprocts round; elongate in *Philotarsus,* (3) phallic frame of approximately even thickness all around, not dilated anteriorly, and lacking a secondary sclerite posteriorly, (4) lateral gonapophyses of female triangular, (5) pigmented areas of subgenital plate wide, (6) antennal color pattern: each flagellar segment is white at its apex which contrasts sharply with the darker remainder, (7) many of the hairs on the veins of the fore wing with brown spots at their bases. Also of probable generic value is the peculiar tip of the maxillary pick (see pl. 9, fig. 5), and the well-developed

[1] Published with a grant from the Museum of Comparative Zoology at Harvard College.

[2] When preparing this paper, I overlooked a paper by Dr. A. B. Gurney (Jour. Wash. Acad. Sci., 39: 56-65, 1949) in which records of *Philotarsus flaviceps* (Ste.) from Mount Desert Island, Maine, are cited.

gonopore plate, apparently absent or at least not sclerotized in *Philotarsus*.

Genotype: *Elipsocus maculosus* Aaron

Aaroniella maculosa (Aaron)

(Pl. 8, Figs. 1, 4, 5, 7; Pl. 9, Figs. 3, 4, 5, 6, 8, 9)

Elipsocus maculosus Aaron (1883, p. 40, pl. 9, fig. 8)
Philotarsus maculosus (Aaron) Chapman & Nadler (1928)

No measurements are given in the original description. The following are for a typical male and female: Fore wing: ♂ 3.36 mm., ♀ 2.85 mm. Total body length: ♂ 2.85 mm., ♀ (gravid) 3.24 mm. Antennal length: ♂ 2.49 & 2.55 mm., ♀ 2.10 mm.

The figure of the fore wing in the original description is not very detailed and has at least one inaccuracy — vein An is shown with hair, Ax hairless, whereas actually it is just the reverse. I here include figures of both wings. The male shows a very minute spur vein on the posterior edge of the pterostigma; this is lacking in the female. Male ocellar interval dark, that of female pale. Both sexes with rather numerous long hairs posteriorly on vertex and a fuscous lateral band starting just behind head, widening on the meso- and metapleura, narrowing again on the abdomen, and ending at the sclerotized terminal segments. Male genitalia (pl. 8, fig. 5; pl. 9, fig. 4): phallic frame anteriorly rounded and narrow, slightly wider on sides. A complex group of 'accessory sclerotizations' lies just above the frame and is easily visible between its sides. Aedeagal arch tuberculate. Hypandrium rather weakly sclerotized, hairy. Epiproct (pl. 8, fig. 4) emarginate posteriorly. Female genitalia (pl. 8, fig. 7; pl. 9, figs. 3, 8, 9): lateral gonapophyses triangular, hairy. Subgenital plate with wide pigmented areas separated in the middle; apical half sclerotized, and a small separate sclerite at extreme apex. Gonopore plate large and well sclerotized.

I have given (Mockford—in press) some biological observations and Indiana records of this species. Late-instar nymphs have numerous gland hairs on abdominal tergites and wing pads, but very few on head, thorax, and legs where there are numerous tapering hairs.

Other species of *Aaroniella*

Mr. J. V. Pearman has very kindly sent me drawings of two other species belonging in this group: (1) of a ♂ of an undescribed species in his collection; this agrees with the genotype in all bisexual and male characters listed in the generic diagnosis, (2) copies of drawings of *Philotarsus badonelli* Danks (1950). This is described from a female and agrees with the genotype in all female characters listed in the generic diagnosis plus (7). The antennae are not figured. In addition we suspect several other known species of belonging here.

Philotarsus Kolbe, 1880

In addition to the characters given by Badonnel (1943:70) it would appear that the females of this genus always have the pigmentation of the subgenital plate in the form of a pair of rather slender converging arms. Several figures of the genotype, *P. flaviceps* (Ste.) are given by Badonnel (op. cit.:71). These plus a drawing of the phallic frame sent to me by Mr. Pearman were used for comparison with the following species.

Philotarsus kwakiutl n. sp.

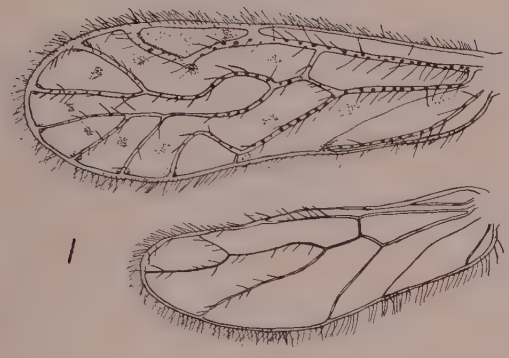
(Pl. 8, Figs. 2, 3, 6, 8; Pl. 9, Figs. 1, 2, 7)

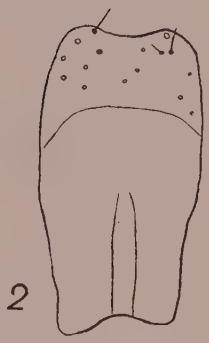
Measurements of typical male and female: Fore wing: ♂ 3.27 mm., ♀ 3.24 mm. Total body length: ♂ 1.86 mm., ♀ 2.58 mm. Antennal length: ♂ 2.91 mm., ♀ 1.89 mm.

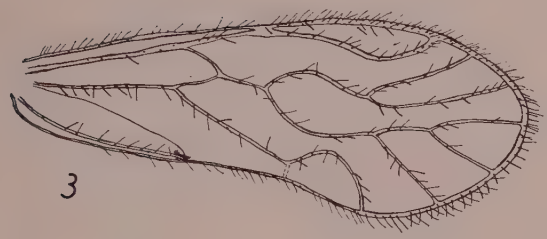
Near the genotype, differing in that (1) apex of fore wing in both sexes is more prolonged, (2) areola postica is slightly longer and lower, (3) pigmented area of subgenital plate (pl. 9, fig. 1) more u- than v-shaped, (4) apical sclerite of subgenital plate shorter and wider, (5) tubercle of dorsal gonapophysis proportionately larger, (6) phallic frame (pl. 8, fig. 6), especially the anterior, basal portion long and drawn out.

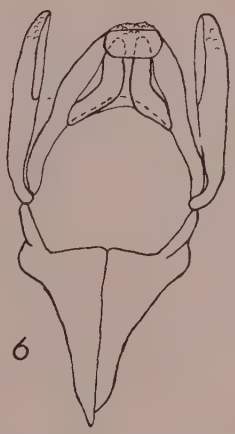
Explanation of Plate 8

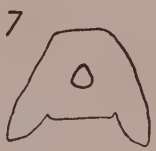
Fig. 1, *Aaroniella maculosa* (Aaron), ♂, fore and hind wings. Fig. 4, the same, ♂, epiproct. Fig. 5, the same, ♂, phallic frame. Fig 7, the same, ♀, gonopore plate. Fig. 2, *Philotarsus kwakiutl* n. sp., ♂, epiproct. Fig. 3, the same, ♂, fore wing. Fig. 6, the same, ♂, phallic frame. Fig. 8, the same, ♂, paraproct.

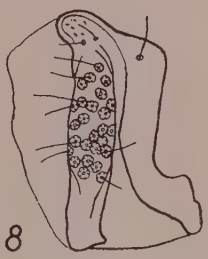












MOCKFORD — PHILOTARSIDS

Coloration: sexes similar. Clypeus with brown lineations separated into two groups by a pale line down the middle. They converge in the lower half forming a median band. Vertex with a band of brown spots along the epicranial suture and a group of brown spots just mesad each eye. Ocellar intervals pale. Frons with a posteriorly pointing v-shaped mark in middle. Labrum, antennae, and apical two segments of maxillary palpi brown. Mesonotal lobes: anterior with a pair of brown spots in front; laterals each with a brown band, but all these marks separated by wide pale areas. Fore wing (pl. 8, fig. 3) marked much as in genotype, but markings usually very obscure or absent. Hind wings unmarked. Abdominal tergites irregularly marked with light purplish brown, heaviest on sides.

Holotype ♂: Port Townsend, Washington, June 29, 1948, ex foliage of *Thuja plicata*, in author's collection. Allotype ♀: same data as for holotype. Paratypes: Port Townsend, Washington: 8 ♂, 7 ♀, same data as for holotype. 1 ♀, July 5, 1948, ex foliage of *Thuja plicata*. 1 ♂, 2 ♀, July 6, 1948, on dead, lichen-covered laurel twigs. Of these, 2 ♂, 2 ♀ will be placed in the K. M. Sommerman collection, and 1 ♂, 1 ♀ will be placed in the Museum of Comparative Zoology, Cambridge, Mass.

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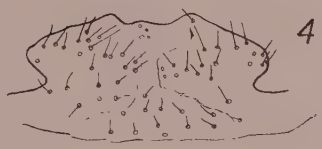
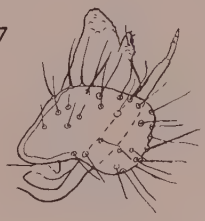
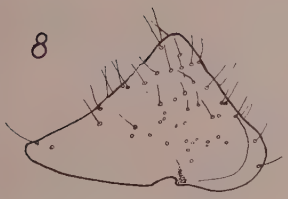
1950. Novyi vid senoeda. Pscoptères—*Philotarsus badonelli* Danks sp. n. ♀. Gos. Muzei Prirody Riga LSSR, Coobshchenie No. 1.

Explanation of Plate 9

Fig. 1, *Philotarsus kwakiutl* n. sp., ♀, subgenital plate. Fig 2, the same. ♂, hypandrium. Fig. 7, the same, ♀, gonapophyses. Fig. 3, *Aaroniella maculosa* (Aaron), ♀, subgential plate. Fig. 4, the same, ♂, hypandrium. Fig. 5, the same, ♂, maxillary pick. Fig. 6, the same, ♂, antenna. Fig. 8, the same, ♀, lateral gonapophysis. Fig. 9, the same, ♀, dorsal and ventral gonapophyses.







MOCKFORD — PHILOTARSIDS

REDESCRIPTION OF *PARAPAOLIA SUPERBA* (SCUDDER) (PROTORTHOPTERA)

By F. M. Carpenter
Harvard University

In a general account of Palaeozoic insects, published in 1885, Scudder included keys to species of certain genera related to *Dictyoneura* (Palaeodictyoptera). One of the species mentioned under the genus *Paolia* was designated as new and named *superba*. The fossil was said by Scudder to have been collected at Mazon Creek, Illinois, by L. M. Umbach. Unfortunately, Scudder's description consisted of a single short sentence without the aid of a figure. What happened to the specimen after Scudder's examination of it is not clear; Handlirsch was unable to find it when he was preparing his revision of American Palaeozoic insects. At any rate, in 1918 it was in the possession of Dr. Umbach, who sold it at that time to the Field Museum of Natural History in Chicago. Through the courtesy of the authorities of the Museum I have been able to borrow the fossil and to prepare the following redescription and illustration. For reasons given below, I am placing the species in the family Palaeocixiidae of the Order Protorthoptera.

Genus *Parapaolia* Handlirsch

Parapaolia Handlirsch, 1906, Foss. Ins.: 121.

This genus was erected for *superba* without mention of generic characteristics. It differs from *Palaeocixius*, to which it seems to be related, by having the media forked at about mid-wing, instead of at the level of the origin of Rs.

Parapaolia superba (Scudder)

Figure 1

Paolia superba Scudder, 1885, Proc. Amer. Acad. Arts Sci., *20*:173. *Parapaolia superba* Handlirsch, 1906, Foss. Ins.:121.

Fore wing, length, 90 mm.; width, 23 mm. Sc terminating

well beyond mid-wing. Rs arising in the proximal quarter of the wing, and having its first branch arising just beyond mid-wing. CuA apparently free from M; anal veins unknown. Sc and Rs are distinctly concave in the obverse half of the fossil, and R is equally convex. M and its branches appear slightly concave, as is the case in most Protorthoptera.

The hind wing is very incompletely known; it apparently has a more rounded apex than the fore wing, and the radial sector arises nearer the middle of the wing, but the branching of Rs and M is apparently like that of the fore wing.

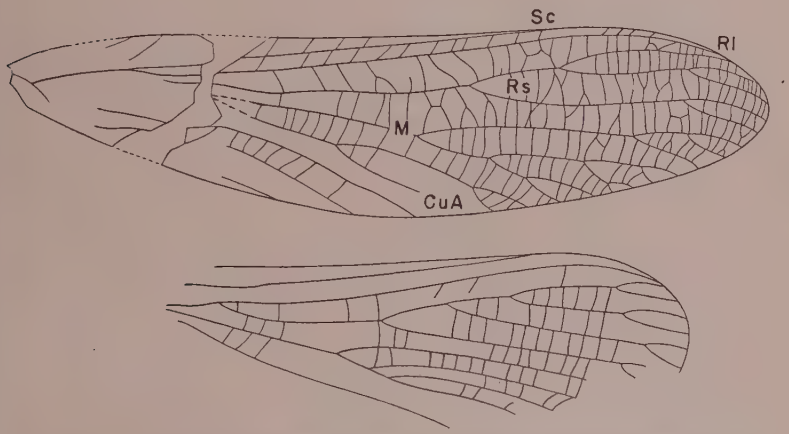


Figure 1. *Parapaolia superba* (Scudder). Fore and hind wings, drawn from holotype.

Holotype: Chicago Museum of Natural History; collected at Naperville, DuPage Co., Illinois, by Dr. L. M. Umbach. The fossil consists of two wings, with parts of the other two, superimposed and resting over the abdomen, no part of which can be distinctly seen.

Scudder placed this specimen in the Palaeodictyoptera,

but since he arbitrarily assigned all Palaeozoic insects to that order, his system of classification is without phylogenetic significance. Handlirsch, who, of course, had no real knowledge of the species, placed it in *incertae sedis* under the Palaeodictyoptera. I have removed the species from that order for two reasons: 1) the superimposed wings strongly indicate that the insect was neopterous; and 2) there is no convex anterior media, the division of the media being remote from the origin of M. The insect therefore seems most probably protorthopterous, though its family affiliation is not clear because of the poor preservation of the wing. I have provisionally placed it in the family Palaeocixiidae, since it shows some resemblance to *Palaeocixius*.

ADLERZIA FROGGATTI FOREL AND SOME NEW SYNONYMY (HYMENOPTERA: FORMICIDAE) — In another paper, now in press, I have discussed the confusion attendant on Forel's description of *Adlerzia*, based on a stray worker of a single species and wrongly placed as a subgenus of *Monomorium*. It has since been determined that two subsequently described ants placed in different genera represent different castes of *A. froggatti*. The following synonymy is suggested here in order to avert proposal of a new name for *Stenothorax* McAreavey, which is preoccupied by Harris and by Agassiz:

Adlerzia froggatti Forel

Monomorium (*Adlerzia*) *froggatti* Forel, 1902, Rev. Suisse Zool., *10*: 445-447, worker [minor]: original description.
Machomyrma silvestrii Emery, 1914, Boll. Lab. Zool. Portici, *8*: 182, fig. 2, soldier; **new synonymy**.
Stenothorax katerinae McAreavey, 1949, Proc. Linn. Soc. N. S. Wales, *74*:3-4, figs. 7-16, worker major [ergatoid?]; worker minor; **new synonymy.**

Stenothorax McAreavey, *nec* Harris, *nec* Agassiz, with the genotype and sole species *katerinae* (*loc. cit.*) becomes an absolute synonym of *Adlerzia* Forel by isogenotypy; **new synonymy**. — BY WILLIAM L. BROWN, JR., Museum of Comparative Zoology.

SEASONAL DISTRIBUTION OF *NAJADICOLA INGENS* (K.) (ACARINA) IN A NEW HAMPSHIRE POND

ARTHUR G. HUMES AND HENRY D. RUSSELL
Department of Biology, Boston University

Certain aspects of the geographical distribution and host relationships of *Najadicola ingens* (Koenike), a water-mite parasitic in fresh-water clams, have been investigated (Humes and Jamnback, 1950), but its seasonal distribution has not been reported. Wash Pond, Hampstead, New Hampshire, was selected for a study of the seasonal incidence and distribution of the mite. This pond was particularly suitable because of the high percentage of clams known to be parasitized there.[1] During the 13 months from December, 1949, to December, 1950, inclusive, a total of 2211 clams, representing three species, was examined for mites. Collections were made monthly, as nearly as possible to the 15th, but in no case earlier than the 14th or later than the 19th day. All clams were collected in 6-30 inches of water from a strip of sandy shore about 500 feet in length at the west end of the pond near an outlet brook.

The three species of clams found and the number of each examined were: *Anodonta cataracta* Say, 1147 specimens, *Elliptio complanatus* Solander, 1038, and *Lampsilis radiata* (Gmelin), 26. The size of each monthly collection and the number of each clam species contained therein (Table 1) varied, because of difficulties in collection, caused by ice, wind, and burrowing of the clams in winter. When possible at least 100 individuals of each clam species were collected. Data concerning *A. cataracta* for February and March had

[1] Humes, A. G., and H. A. Jamnback. 1950. *Najadicola ingens* (Koenike), a water-mite parasitic in fresh-water clams. Psyche, 57(3):77-87.

less meaning than for the other months because of the small numbers of clams collected.

The temperature on the bottom of the pond at a depth of about 24 inches varied from 0.5 degrees C. in March to 26.5 degrees C. in July (Graph 1). The pond was covered with ice in January, February, and March.

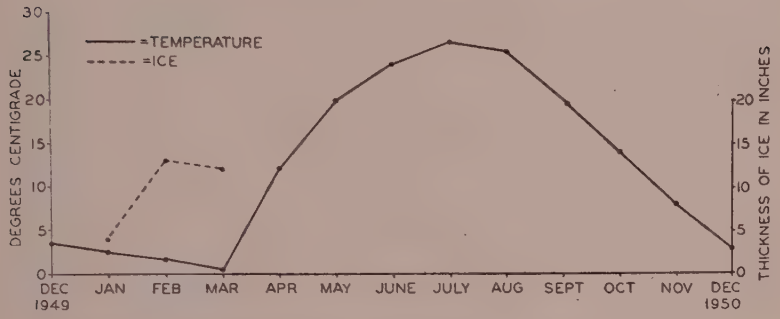
Throughout the 13 months *A. cataracta* was very frequently either parasitized by mites or had papillae in the suprabranchial chambers (which is evidence of having been parasitized) (Table 1). Mites were found in 886 or 77.2 per cent of the 1147 *A. cataracta* (a figure lower than the 87.3 per cent given by Humes and Jamnback, 1950, which was based upon a single November collection) and papillae only in 160 or 13.9 per cent. The total number of *A. cataracta* parasitized or with papillae was 1046 or 91.2 per cent, leaving 101 or 8.8 per cent unparasitized and without papillae.

E. complanatus was parasitized or had papillae much less frequently than *A. cataracta* (Table 1). *N. ingens* occurred in 19 or 1.8 per cent of the 1038 *E. complanatus*. No papillae were observed in the suprabranchial chambers of this species.

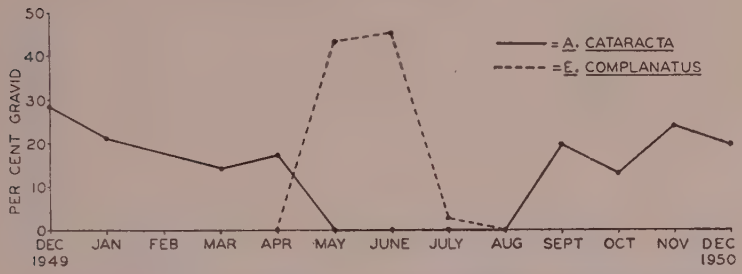
No *N. ingens* were found in *L. radiata*.

Adult male and female *N. ingens* occurred throughout the 13 months. The frequencies of clams with one male and one female adult mite, with males only, or with females only, showed no seasonal trends. Four hundred and fifty-five, or an average of 35 or 51.4 per cent per month (extremes of 5-64 or 41.6-66.6 per cent) of the parasitized *A. cataracta*, had at least one male and one female mite. Three hundred and twenty, or an average of 24.6 or 36.1 per cent (3-62 or 25.0-50.0 per cent), had male mites only. One hundred and eleven, or an average of 8.5 or 12.5 per cent (1-22 or 5.2-27.6 per cent), had female mites only.

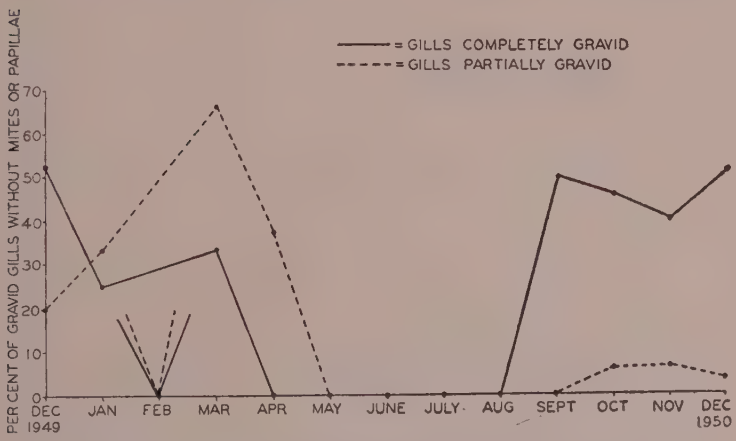
A. cataracta with glochidia in the gills was found from September to April inclusive (Graph 2). All glochidia were shed by the middle of May, when the bottom temperature had risen to 20 degrees C. The gills were not found gravid again until the middle of September, when the



GRAPH 1. BOTTOM TEMPERATURE AND THICKNESS OF ICE IN WASH POND.



GRAPH 2. MONTHLY OCCURRENCE OF GRAVID A.CATARACTA AND E.COMPLANATUS.



GRAPH 3. MONTHLY OCCURRENCE OF COMPLETELY AND PARTIALLY GRAVID GILLS IN UNPARASITIZED A. CATARACTA.

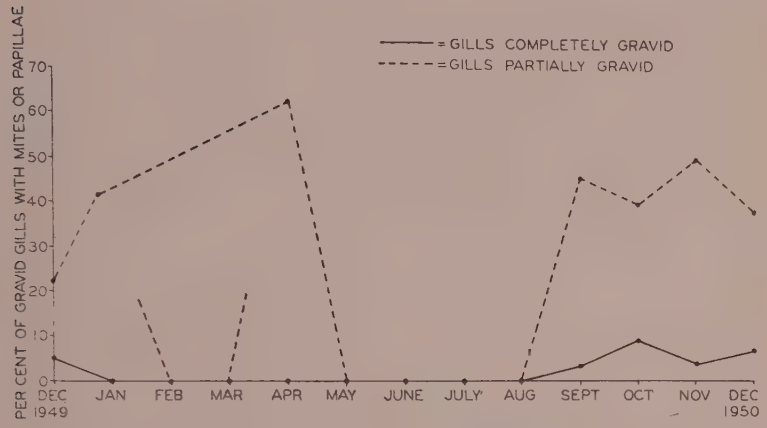
bottom temperature had dropped to 19.5 degrees C. At that time many clams were gravid (19.1 per cent of all *A. cataracta* of both sexes, both parasitized and unparasitized, collected in September).

In unparasitized *A. cataracta* without papillae gravid gills tended to be filled completely with glochidia in September and through the winter months (Graph 3). No gravid clams were found in the small February sample. The reference lines to February are not connected to the rest of the graph because of the inadequate sampling. As spring approached, the glochidia were gradually shed, and the percentage of clams with partially filled gills increased, reaching a high point in March. By May all gravid clams contained only a relatively few glochidia, usually in the central part of the gills. During this time the percentage of clams with completely filled unparasitized gills became smaller.

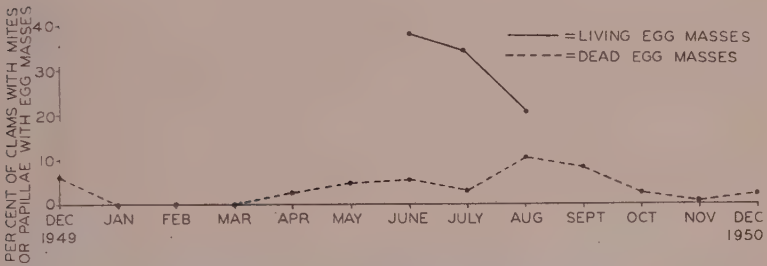
In parasitized gills or those with papillae the glochidia completely filled the gills in only a relatively few cases, and then only during September to December inclusive (Graph 4). No gravid clams were found in the small February and March collections. As in Graph 3, the reference lines to these months are not connected to the rest of the graph. Most gills with mites or papillae were incompletely filled with glochidia even early in the gravid period. For example, in September 46.3 per cent of all the gravid gills with mites or papillae were partially filled, while only 3.7 per cent were completely filled. On the other hand, in the same month all unparasitized gravid gills were completely filled.

Glochidia were found in the gills of *E. complanatus* from May to July inclusive (Graph 2). These clams were first found gravid in the middle of May, when the water temperature had risen to 20 degrees C., and were shed by the middle of August, when the temperature was 25.5 degrees C. No significant data on the seasonal distribution of the mites in this species were collected, since so few clams were parasitized (Table 1).

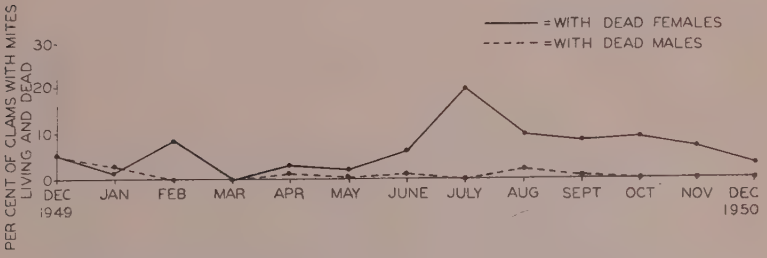
Living egg masses of *N. ingens* were present in *A. cataracta* only in June, July, and August (Graph 5), coincid-



GRAPH 4. MONTHLY OCCURRENCE OF COMPLETELY AND PARTIALLY GRAVID GILLS IN PARASITIZED A. CATARACTA



GRAPH 5. MONTHLY OCCURRENCE OF LIVING AND DEAD EGG MASSES IN A. CATARACTA WITH MITES OR PAPILLAE



GRAPH 6. MONTHLY OCCURRENCE OF DEAD MALE AND FEMALE MITES IN PARASITIZED A. CATARACTA.

ing with the time when the water temperature had reached its maximum of 26.5 degrees C. In June 38.1 per cent of the number of clams with mites or papillae for that month contained masses of living mite eggs. The eggs at this time were all white or light yellow, indicating that they had been laid recently. Observations of Humes and Jamnback (1950) have indicated that the eggs when first laid are light cream in color, but darken as development progresses to almost black at hatching, which may occur in 17 days in distilled water at summer room temperatures. In July many of the egg masses were various shades of brown, and some had already hatched. In August only 20.8 per cent of the clams with mites or papillae contained egg masses. These were generally dark in color or already hatched. A few, however, were light cream in color, indicating recent oviposition.

Dead egg masses were found in all months except January, February, and March (Graph 5). The absence of dead egg masses in these three months may be accounted for by the relatively small size of the samples of clams collected. Dead egg masses were never found in more than 10.4 per cent (in August) of the clams with mites or papillae. Apparently egg masses which were laid late in the period of oviposition and had not hatched by the middle of September died and remained in the suprabranchial chambers for several months. The dead egg masses found in April and May must have been laid during the preceding summer, since oviposition did not begin until sometime after the middle of May.

No egg masses were found in *E. complanatus* or in *L. radiata.*

Dead *N. ingens* (Graph 6) were found in parasitized *A. cataracta* in every month except March, a month when the small clam sample could account for their absence. Dead males occurred in small numbers during 6 of the 13 months, with no significant seasonal variation. Dead females occurred in every month except March, but were most abundant in July and succeeding few months. The sudden increase in incidence of dead females in July to 20.3 per cent of the parasitized *A. cataracta* occurred one month after

	A. cataracta				*E. complanatus*			*L. radiata*		
	total number	number with mites	number with papillae only no mites	% of total with mites or papillae	total number	number with mites	% with mite	total number	number with mites	% with mites
December 1949	57	38	9	82.5	5					
January 1950	38	30	8	100.0						
February	13	12		92.3	98	3	3.1			
March	14	12	1	92.9	17					
April	111	99	10	98.2	107	1	0.9	2		
May	117	92	14	90.6	111	1	0.9			
June	102	78	19	95.1	102	1	1.0	4		
July	76	59	8	88.2	108			16		
August	107	80	16	89.7	120	5	4.2	4		
September	131	103	19	93.1	131	1	0.7			
October	117	87	17	88.9	126	2	1.6			
November	170	139	21	94.1	97	5	5.1			
December	94	57	18	79.8	16					
Total	1147	886	160		1038	19		26	0	
Average %				91.2			1.8			0

Table 1. Size of monthly clam collections, number of clams parasitized or with papillae, and percentage parasitized or with papillae.

the time of maximum oviposition in June (Graphs 5 and 6). This fact suggests that at least some females die after oviposition and that their bodies may remain in the suprabranchial chambers for several months.

Nymphs of *N. ingens* occurred in small numbers in all but 4 of the 13 months (December, January, May, and September) with no significant seasonal variation.

The total number of mites recovered from the 1147 *A. cataracta* was 1400 (with monthly extremes of 17-207), comprising 893 males (11-137) and 507 females (6-74). This gave an average of mites of either sex per parasitized clam of 1.58 (1.22-1.85). During the 13 months neither the average number of mites per parasitized clam nor the percentage of males and females changed significantly. The average monthly percentage of males in the total of 1400 mites was 63.8 per cent (52.4-67.2), while that of females was 36.2 per cent (32.7-47.6). The sex ratio of males to females was 1.76:1.

The distribution of adult mites among the four suprabranchial chambers of *A. cataracta* did not vary significantly throughout the 13 months. The most frequently occupied position was the outer suprabranchial chambers (in 865 or 97.6 per cent of the 886 parasitized clams). In a few clams mites occurred in the inner suprabranchial chambers (7 or 0.8 per cent) and in both outer and inner chambers (14 or 1.6 per cent).

Summary

1. Monthly collections from December, 1949, to December, 1950, inclusive, in Wash Pond, New Hampshire, showed *Najadicola ingens* to occur most commonly in *Anodonta cataracta* and occasionally in *Elliptio complanatus*. The mite did not occur in *Lampsilis radiata*. The monthly incidence of adult male and female mites showed no significant seasonal changes.

2. The gills of *A. cataracta* were gravid from September to May inclusive. In gills with mites or papillae the glochidia usually only partly filled the gills, even early in

the gravid period, when unparasitized gills without mites or papillae were completely gravid.

3. Living egg masses of *N. ingens* were found in *A. cataracta* only in June, July, and August, months which coincided with the highest water temperature. June egg masses were recently laid, July masses were older for the most part, and August masses were mostly near hatching or had already hatched. This indicated a rather sudden oviposition early in June, followed by a slackening of egg laying until September, when it ceased. Egg masses which have not hatched by September probably die and may remain in the suprabranchial chambers for several months.

4. Dead adult males were found in *A. cataracta* throughout the 13 months in about equal numbers. Dead adult females were most abundant in July, one month after the maximum oviposition, suggesting that at least some females die after oviposition and that their bodies may remain in the suprabranchial chambers for several months.

5. Nymphs were found in small numbers in *A. cataracta* in all but 4 months (December, January, May, and September) without significant seasonal variation.

6. An average number of 1.58 adult mites per parasitized clam was recovered from *A. cataracta*. This average number and the relative numbers of male and female mites showed no seasonal trends. The sex ratio of males to females was 1.76:1.

7. Throughout the 13 months the mites most often occurred in the outer suprabranchial chambers of *A. cataracta*. In only a few cases were mites found in the inner or in both outer and inner suprabranchial chambers.

REDESCRIPTION OF *CHEIRACANTHIUM MILDEI* L. KOCH, A RECENT SPIDER IMMIGRANT FROM EUROPE

By Elizabeth B. Bryant
Museum of Comparative Zoology

The fauna of New England has often been compared to that of Great Britain, which has about the same area. Dr. B. J. Kaston in his recent book, "The Spiders of Connecticut", 1948, states that 644 species of spiders have been recognized in New England, and that 72 of these are common to Europe. Some are endemic, but others have been introduced by commerce. In the summer of 1949, a spider carrying a cocoon of eggs and new to our fauna, was brought to the museum by Dr. A. M. Chickering. It proved to be *Cheiracanthium mildei* L. Koch, a species native to southern Europe.

The genus is known in Europe by 34 species and previously in North America by only one, *Cheiracanthium inclusum* (Hentz), found from New England south to Florida and the islands of the Caribbean. *Cheiracanthium mildei* was first described from Meran, Dalmatia, in 1864. It has subsequently been reported from Switzerland, Hungary, the Caucasus and Palestine. Since 1949, when the female mentioned above was recognized, additional specimens of both sexes have been found in Connecticut and New York, indicating that the species is established in our area.

I wish to express here my thanks to Dr. W. J. Gertsch, of the American Museum of Natural History, to whom we are indebted for the gift of a pair of this species taken at New Rochelle, New York, June, 1947.

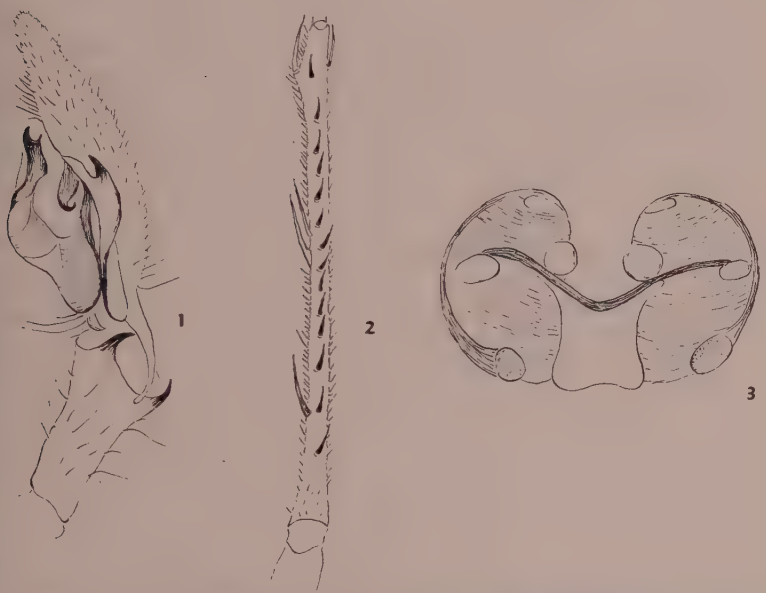
Cheiracanthium mildei L. Koch

Figures 1-3

Cheiracanthium mildei L. Koch, 1864, p. 144. "♂ ♀ in sudlichen Tirol (Meran) in Dalmatien, (Sammlung des Herrn Grafen Keyserling)".

Female: Length, 7.0 mm., ceph. 3.0 mm. long, 2.5 mm. wide, abd. 4.6 mm. long, 3.1 mm. wide.

Cephalothorax pale yellow, anterior margin truncate, about half the greatest width, moderately high, no thoracic groove but the area slightly darker and called by Simon a "false groove"; *eyes* subequal, anterior row slightly recurved, eyes equidistant, posterior row a little longer than the anterior, procurved, eyes equidistant, lateral eyes



Figs. 1-3, *Cheiracanthium mildei.* Fig. 1. Left palpus, retrolateral view. Fig. 2. Fourth metatarsus, ventral view. Fig. 3. Epigynum, ventral view.

separated by a radius; *quadrangle* of median eyes narrower in front and as high as wide behind; *clypeus* below a.m.e. about equal to a radius of a.m.e.; *mandibles* vertical, large, fang groove oblique, lower margin with three contiguous teeth; *labium* wider than long; *maxillae* twice as long as the labium with the tips widened; *sternum* pale, smooth, convex, longer than wide, (5.0:4.1); *abdomen* pale, oval,

convex, with no markings; *legs,* 1-2-4-3, pale, spines weak and inconspicuous, 1 pair, tibia, ventral, 2, median, metatarsus longer than the tibia, spines, ventral, 2 at the base, II pair, tibia, ventral, 2 at the base, metatarsus, 2 at the base; *epigynum,* area wider than long, divided about the middle by a transverse dark chitinized curved ridge, the anterior half with a pair of widely separated oval depressions, the posterior half divided by parallel vertical dark lines into a broad median septum with the extreme lateral margins ending in small circular sacs below the surface, as figured.

According to the late Dr. de Lessert of Geneva, Switzerland, the epigynum is often filled with a resin that obscures the various parts, but the transverse ridge is distinct.

Male: Length, 7.0 mm., ceph. 3.1 mm. long, 2.5 mm. wide, abd. 4.5 mm. long, 2.2 mm. wide.

Cephalothorax pale, with short hairs, quite flat, anterior margin less than half the greatest width, thoracic groove faintly indicated; *eyes* as in the female; *clypeus* less than a radius of a.m.e.; *mandibles* ventral, long and narrow, teeth on the fang groove as in the female; *labium* as in the female; *maxillae* emarginate on the outer side; *sternum* as in the female; *abdomen* pale, oval; legs, 1-2-4-3, pale, spines black and conspicuous, 1 pair, femur, dorsal, median, 2, prolateral, 1, tibia, ventral, 2-2-2-2, metatarsus, 2, basal, II pair, femur, dorsal, 2-2, prolateral, 1, heavier than on I femur, tibia, 2-2-2-2, metatarsus, 2, basal, IV metatarsus, ventral, 14 short spines, (fig. 2) much shorter and heavier than the lateral spines; *palpus* (fig. 1) about as long as the cephalothorax, pale, with the terminal joint much darker, patella as long as wide, tibia about three times as long as wide, but not as long as the cymbium, with two short dark dorsal cusps at the tip, the dorsal cusp short and straight, the retrolateral cusp longer, more slender with the tip incurved, the tip of the slender process from the cymbium resting between the two, palpal organ confined to the lower two-thirds of the cymbium, bulb protruding from the cavity, embolus starts on the side about the middle, passes below the bulb as a slender tube and ends on the margin about opposite to the origin.

The eggs are flesh-color, about 0.5 mm. in diameter, in a compact mass, loosely enclosed in a thin transparent cocoon.

♀ Massachusetts; Cambridge, 26 July, 1949, (Chickering)

♂ Massachusetts; Cambridge, in museum, 18 July, 1947, (Bryant)

♂ Massachusetts; Brookline, 27 July, 1947, (Bryant)

♂ ♀ New York; New Rochelle, June, 1947, (Lacy)

The male of *Cheiracanthium mildei* is easily separated from that of *C. inclusum* by several characters. The tibia of the palpus of *mildei* has two short processes at the tip, while *inclusum* has one long process which interlocks with a similar process from the cymbium; *mildei* has on the fourth metatarsus a ventral row of short black spines that are very conspicuous; and on the second femur the prolateral spine from a raised base is much smaller than on *inclusum*. The females can be separated by the epigyna. In *mildei* the area is divided by a dark transverse bar, while in *inclusum*, the epigynum is an oval transverse pit which shows no structure.

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New Synonymy In The Army Ant Genus Aenictus Schuckard.—*Aenictus deuqueti* Crawley (1923, Ent. Rec., *35*:177, worker) is a **new synonym** of *Aenictus turneri* Forel (1900, Ann. Soc. Ent. Belg., *44*:75, worker). I compared types of Forel's and Crawley's species in the British Museum. Crawley's distinctions are inconsequential or else, as in the case of the color, inaccurately described. — W. L. Brown, Jr., Museum of Comparative Zoology.

SYNONYMOUS ANT NAMES. — The following new synonymy has recently been established:

Kyidris nuda Brown (1949, Mushi, *20*:23-24, female) is a **new synonym** of *Kyidris mutica* Brown (1949, Mushi, *20*: 3-6, fig. 1, worker). Of nests reared by Okamoto in Shikoku, the workers are typical of *K. mutica*, while the females agree perfectly with the Formosan type of *K. nuda*. Dr. Yasumatsu has kindly made the necessary comparison. The families are relatively unusually small for dacetines, and differ in sculpture and pilosity from the workers.

Lordomyrma nobilis Yasumatsu (1950, Ins. Matsumurana, *17*:75-78, fig. 2, worker, male) is a **new synonym** of *Rogeria azumai* Santschi (1941, Mitt. schweiz. ent. Ges., *18*: 275), making a **new combination**, *Lordomyrma azumai* (Santschi). Santschi's description arrived belatedly in Japan. Types of the two forms, compared by Dr. Yasumatsu, prove to be identical. — W. L. BROWN, JR., Museum of Comparative Zoology.

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